



Designation: C 1253 – 93 (Reapproved 2005)

## Standard Test Method for Determining the Outgassing Potential of Sealant Backing<sup>1</sup>

This standard is issued under the fixed designation C 1253; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method provides a procedure for determining the outgassing potential of a sealant backing when it is punctured during or after installation, with the puncture occurring before the sealant cures.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

2.1 *ASTM Standards:*

**C 717** Terminology of Building Seals and Sealants<sup>2</sup>

**C 1193** Guide for Use of Joint Sealants<sup>2</sup>

### 3. Terminology

3.1 *Definitions*—Refer to Terminology **C 717** for the following terms used in this test method: sealant, cure, sealant backing, joint, substrate, non-sag sealant, tooling, and outgassing.

### 4. Summary of Test Method

4.1 A sample of sealant backing material is placed between nonporous substrates in a compressed condition, simulating the placing of sealant backing on a job site. The sealant backing is then punctured at intervals along its exposed face. A sealant is applied immediately after puncture, and it is tooled to make a typical butt joint as described in Guide **C 1193**. After tooling, the specimen is placed in an air circulating oven at elevated temperature for 1 h and then removed. The specimen is

compressed 12½ % of its diameter and in the compressed state returned to the oven. The specimen is removed after another hour in the oven and compressed another 12½ % and returned to the oven, where it remains for another 2 h. The specimen is removed from the oven, and the sealant is allowed to finish curing at room temperature, while in the compressed condition. The sealant is then removed from the specimen, and the back face (the face against the sealant backing) is examined. The sealant is slit in half along its length and the size of any voids estimated.

### 5. Significance and Use

5.1 This test method is an indicator of a potential sealing problem that could occur if a sealant backing is flawed in manufacture or transportation to the job site, or abused during the installation. If flawed, some sealant backing materials, in combination with certain environmental conditions, can outgas, generating voids in the applied sealant before the sealant cures, thereby potentially compromising the cured sealant's intended performance.

5.2 Voids are also known to be caused by other means and under certain conditions such as air entrapment during sealant application, trapped air in the substrate releasing into the uncured sealant, incompatibility of the sealant with the sealant backing or substrate, or inhospitable installation conditions in the field. This test method is limited to identifying the outgassing potential of a punctured sealant backing by formation of a void in the soft uncured sealant under conditions of heat and compression.

### 6. Apparatus

6.1 *Air Circulating Oven*, capable of maintaining a temperature of 122°F (50°C).

6.2 *Test Frame and Stylus*, as described in **Annex A1**.

### 7. Test Specimens

7.1 Sealant backing should be 307.8-mm (12-in.) long and of a width appropriate for use in 12.7-mm (½-in.) wide joints. The proper width will be as specified by the sealant backing manufacturer.

NOTE 1—The test method is specifically for 12.7-mm (½-in.) wide joints and sealant backings used in such joints. The procedure is adapted

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

easily to either wider or narrower joints if all compression is considered as a percent of the joint width.

**8. Conditioning**

8.1 Condition all sealant backing and sealants at standard conditions for a minimum of 12 h prior to testing. Standard conditions for this procedure are  $23 \pm 2^\circ\text{C}$  ( $73.4 \pm 3.6^\circ\text{F}$ ) and  $50 \pm 5\%$  relative humidity.

**9. Procedure**

9.1 Prepare the test specimen by placing the sealant backing in the simulated joint apparatus (Fig. A1.1 and Fig. A1.2), which has been adjusted to a 12.7-mm (1/2-in.) wide opening. Exercise care not to abuse or puncture the sealant backing during installation.

9.2 Use the stylus (Fig. A1.3) to form six 9.5-mm (3/8-in.) deep punctures starting 38-mm (1 1/2-in.) from the end, spaced 25.4-mm (1-in.) apart, and centered on the width of the sealant backing. The marks on the channel, used to form the joint, aid in locating the quick, even placement of the punctures.

9.2.1 If the sealant backing has a tendency to slip down in the joint during the puncturing, slip a temporary solid form (such as a length of wood) beneath the backing to hold it in place. Remove this when the puncturing is complete.

9.2.2 Time is a critical factor, so make all six punctures in 1 min or less.

9.3 Apply sealant over the sealant backing from a typical caulking gun in a pushing motion so air is not trapped between sealant and sealant backing. Tool the sealant to achieve a slightly concave surface. Consistent with good sealing practices outlined in Guide C 1193, the tooling should be done with sufficient pressure to ensure that the sealant wets the top of the sealant backing and the wall of the simulated joint.

9.3.1 While any non-sag sealant can be used, a clear sealant is preferred since it permits quick identification of any flaws, voids, or bubbles resulting from the installation process. The clear sealant also aids in the detection of voids caused by sealant backing outgassing.

9.3.2 Time is a critical factor, so apply and seal the sealant within 2 min after completing the puncturing.

9.3.3 Prepare and test a control specimen for this test method identically to the test specimen, except do not puncture the sealant backing.

9.4 Place the test and control specimens in a  $50^\circ\text{C}$  ( $122^\circ\text{F}$ ) oven for 1 h.

9.5 Remove the specimens from the oven, and turn the adjusting screws so that the joint is compressed  $12\frac{1}{2}\%$  [ $1.6\text{ mm}$  ( $1/16\text{ in.}$ ) for a  $12.7\text{-mm}$  ( $1/2\text{-in.}$ ) joint], and place them back in the oven for 1 h.

9.6 Remove the specimens from oven, turn the screws to compress the joint another  $12\frac{1}{2}\%$  of the original dimension [ $1.6\text{ mm}$  ( $1/16\text{ in.}$ ) for a  $12.7\text{-mm}$  ( $1/2\text{-in.}$ ) joint], and place them back in the oven for another 2 h.

9.7 Remove the specimens from the oven and allow the sealant to cure at standard conditions for 2 weeks or for the sealant manufacturer’s recommended cure time.

9.8 If a clear sealant was used, bubbles will be evident if they occurred. In all cases, slit the sealant along its entire length at the mid point of the joint width using a sharp razor.

9.8.1 If properly performed, the slit will pass through any voids that have formed. Cut the sealant away from the edge of the substrate (a knife generally works better than a razor). Remove the two sealant halves from the joint and examine the size of the voids.

**10. Report**

10.1 Report the test results and observations on the form shown in Fig. 1.

Sealant Backing ID. _____							
Sealant ID. _____							
Joint Size _____							
Puncture Depth _____							
Number of Voids _____							
Size of Voids							
Puncture #	1	2	3	4	5	6	Mean Avg. Diameter
Average diameter of the void (mm)							
Comments							

FIG. 1 Form for Test Results and Observations

10.2 If no voids occur, indicate “None.”

10.3 If voids are present and they occur directly over the puncture points, indicate the number of voids. Measure the length and width of the voids to the nearest millimeter. Calculate the average diameter of the void.

10.4 In the comments section, note whether voids occurred where no punctures were present, their frequency, size, and other pertinent observations.

**11. Precision and Bias <sup>3</sup>**

11.1 The precision and bias statement based on the number of voids is as follows:

11.1.1 The repeatability (within a given laboratory) interval for five materials tested by four laboratories is 2.553 voids. In the future use of this test method, the difference between two test results obtained in the same laboratory on the same material will be expected to exceed 2.553 voids only approximately 5 % of the time.

11.1.2 The reproducibility (between given laboratories) interval for five materials tested by four laboratories is 2.637 voids. In the future use of this test method, the difference between two tests results obtained in a different laboratory on

<sup>3</sup> Supporting data have been filed at ASTM Headquarters. Request RR: C24-1038